Electricity on the Farm

A Monthly Magazine for the Progressive Rural Family

V.5:1

January 1932

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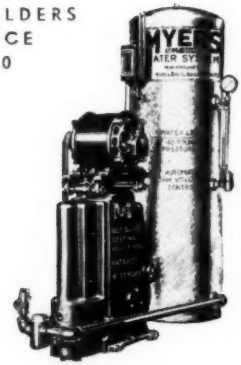

Fig. 2621

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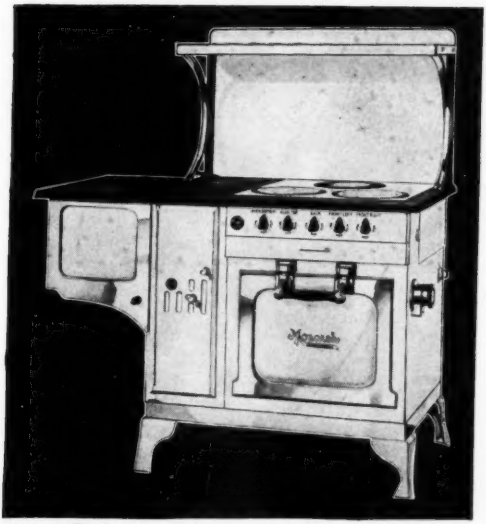
To Farm Women—

This MONARCH Fuel-Electric range is just what the farm kitchen needs . . .



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Monarch

Use Hot Water—

and don't wipe the dishes

THE following is a quotation from an article on correct dishwashing published by *Cleanliness Institute.*

"The dishes need not be dried by towel if the rinsing water is hot enough and can drain off. In fact, an otherwise efficient dishwashing method may be quite nullified by a soiled bacteria-laden towel."

WE ARE NOT recommending a lazy way of doing the dishes, but one that actually does the job better—with less work. The ***Cleanliness Institute***, in a bacteriological study of dishwashing, has found that the thorough rinsing of dishes with very hot water actually leaves them cleaner than wiping with an ordinary dish-towel, which may carry unseen dirt from one dish to another.

You can get hot water for rinsing by old-fashioned hand methods, of course, but the saving in working time will be largely lost by waiting for water to heat, and results will be less certain due to the varying water temperatures. For speedy and certain dishwashing, use an automatic storage water heater. Plenty of hot water is always ready in its most convenient form, and temperatures are kept at a constant high level by the automatic controls. An automatic water-heater makes it easier to be thoroughly clean in your housekeeping.

ELECTRICITY ON THE FARM

JANUARY, 1932

'Tis the farmer's care
That makes the field bear.

—German Proverb.

The care which can be given to farm property is largely dependent upon the efficient use of time. Certain operations, such as cultivating, planting and harvesting, must be performed within definite time limits. Other tasks rightly should be dovetailed in between.

With chores and emergency tasks interfering, it used to be quite impossible to assign the time to field work it deserved. Preparing the feed for livestock by hauling it to the custom mill for grinding *during working hours,* taking machinery to town to have it repaired, also *during working hours,* and similar interruptions, played havoc with field work schedules.

But with the advent of electricity on farms the situation has undergone a marked change for the better. There is no more chasing to town to get feed ground, there are no more day trips to have minor repairs made to farm machinery; repairs and chores can be done on the farm as well at night by aid of electric light as during the day.

Confining chores and shop work to the early morning and the evening, when fields are not suitable for working, is not done at the expense of lengthening the hours of work. On the contrary, proper illumination and modernized, electrically-driven machinery, cut short the time necessary to perform chores.

Yes, the old days of chores by lantern light, of post-sunset gloom on the farm, have gone. In their stead, happy labor, lightened by modern illumination and eased by electric power, may be found. And fortunate is the farm household which, too, benefits by this great advance in farm life.

HAVE RATES COME DOWN?

By E. R. MEACHAM

Rural rates are very inviting to radio stations

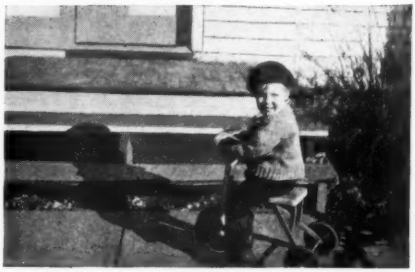
THE argument started at a hearing before the Public Service Commission. To be sure, it was not a rate case at all. Instead, it was an action to establish a division of territory between two neighboring companies. But a group of farmers who were interested in the outcome were present, so it was only natural that the informal discussion outside the hearing room should include the subject of rates.

"While the Commission's about it, why don't they lower our rates, no matter which company is going to serve us?" demanded Ed. Letz, a leading farmer from out near Castle Rock. We fellows have to take less for the things we sell and it's only fair that we should give less for the things we buy. These big power companies, as I understand it, maintain their high rates just the same and these Commissions set up to regulate them, don't do anything about it. Why, I've heard that after you once get hooked on the line, your bills may actually increase, and they're always too big."

The only trouble with Ed's attitude was that he saw only about half the picture. I suppose his attention had been directed to the so-called high cost of electric service by some political propaganda he had read or heard, or by some radical agitator seeking to create an issue. As he looked at the situation, he was probably justified in his conclusion, but there are several other points that he did not consider.

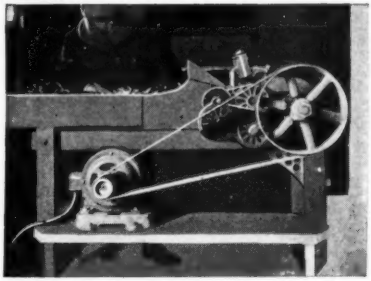
In the first place, is the cost of electric service on the average farm one of the major items of expense? That is, is it large enough, compared with other farm expenses to

Her Daddy uses lots of electricity



Left: The larger the transformer the more current it wastes

Below: Power jobs bring down the average cost of current



justify the emphasis that is being placed upon it by politicians?

The best figures available indicate that in the eastern half of the United States where no large quantities of electric current are used for irrigation, the average farm bill for electric service was $49.00 in 1929 and about $51.00 in 1930. That would seem to support the statement Ed. Letz made that the bills go up, but the fact is that the farmers used so much more in 1930 that the average cost per unit was actually less.

Now how does that $49.00 to $51.00 compare with other farm costs? Take taxes for example. Politicians in office have more to do with the public money that is spent and the taxes that must be raised, than anyone else, so if they really have the well-being of the farmer at heart, their attention might be turned to the tax situation.

I have no figures on taxes as late as my figures on electric bills, but since it is a well known fact that taxes are steadily climbing, the figures I will quote are probably more favorable than later ones would be. In 1926 the farmers of Wisconsin paid $1.22 an acre on the land in farms. This amounted to $137.32 per farm and made up more than a quarter of all the property tax in the state.

In the same year the average farm expenditure for hired labor was $146.72, for purchased feed $162.16 and for interest on indebtedness, $200.53. Compared with $200.00 interest on what he doesn't own, and $137.00 taxes on what he does own, the electric bill, which was probably not more than $35.00 a year in 1926, does not look so big.

Even so what are we going to do with Ed.'s statement, "that these big power companies maintain their high rates just the same?"

Well, that has to be met from two directions. In the first place, electric rates cannot be expected to come down as other prices have come

A dependable hired man is the electric motor

down in the last few years for the simple reason that these rates never went up in the boom period during and after the war. In other words, Ed. was wrong about maintaining high rates because on the average throughout the country, electric rates are not high and have never been high since this service became available to any great number of farmers.

Unit Cost Decreasing

Rural service is so new and has been such a small part of the whole electric business, that very few figures covering average conditions throughout the country are available. We do know, however, that the whole history of electric service shows a constantly decreasing unit cost.

The chart shows that in 1891 what little electricity was used in the homes of this country cost 19c a kilowatt hour and that the price went steadily downward to 1918. The pre-war price in 1913, which is taken as the 100% base line for most price comparisons, was 8.7c. There was one little rise in 1918, but that was quickly corrected, and the average cost has continued to decline since then.

Living Costs Still High

During 1920, the general cost of living was more than twice as high as it was in 1913. It is still 50% higher than the 1913 base, but the price of all electric energy used in homes is only about two-thirds of what it was then.

The index of prices of farm products makes a very different looking line on the chart. Here a slightly different base line is used, 100% representing the average price of farm products from August 1909 to July 1914. By comparing the two lines, it is easy to see that since the cost of electric service did not go up when farm prices went up, there is no need and in fact, no fairness in expecting them to come down as farm prices do.

If the public utilities were not regulated by government commissions, but were allowed to charge anything they could get for their service, the conditions might be very different, but I doubt if they would be any better. For example, the manufacture of shoes is an independent, unrelated business, but are shoes cheaper than ever before? In fact, is there *anything* except electricity that the farmer has to buy that is cheaper than it ever was before?

For very limited uses in the country, the rates are higher than they are for the same use of energy in town. That is as it should be for it certainly costs a great deal more to bring the service out into the country. On the other hand, the average farmer in his home and in his business, has practical use for many times more electrical energy than the average householder in town. If he uses the service at his command as fully and as practically in proportion to his needs as his city cousin does, he will usually find his average rates as low or even lower.

A very large part of the total cost of supplying electric service in the country is entirely independent of the amount of energy used. These are the costs that must be met year in and year out whether the farmer uses much or little or none at all. Most of this expense is due to the transmission of energy from place to place and its distribution over the farm lines, together with the losses that occur throughout the process.

Transmission Costs High

The fact is, that if electricity were something like salt or coal, that a man could load into a wagon at the power house and haul home to be used as he needed it, it would be very cheap indeed. In that case those things that make up by far the greater part of the cost of supplying service, all of the investments, and interest and taxes and depreciation and losses due to the transmission and distribution systems would be avoided.

If, on the other hand, power was given away at the generating station absolutely free, that is, put out of the transmission lines without cost and distributed just as it is now, the bill for rural service

would hardly be affected at all.

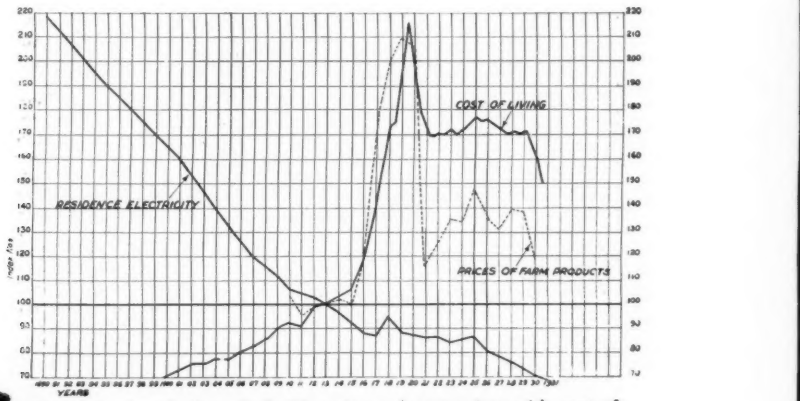
Let us consider the single item of taxes. Any student of agriculture knows that farmers pay far more than their just share of the country's taxes, but in the last 25 or 30 years the power company's tax bill has gone up a great deal faster than the farmer's tax bill has. For example—in 1902 the power companies in the United States paid $2,655,000 in taxes or 3.4c out of every dollar they received from their customers, but in 1930 they paid $203,500,000 in taxes which was 10.2c out of every dollar paid in by the consumer of electric service. In the 29 year period, the business, of course, increased tremendously but the taxes, in going from 3.4% to 10.2% of the gross revenue, have outstripped the growth of the revenue 3 to 1.

Fixed Charge Comparisons

Suppose that the fixed charges, that is, the costs that do not vary as different amounts of current are used, average $50.00 a year for a certain group of farmers. There are lots of places where that figure would be about correct. Then let us suppose that one of this group of farmers with lights and a few small appliances, uses 500 kilowatts a year. Then the fixed charges alone, without anything for current, would amount to 10c a kilowatt hour. Then suppose he got to studying the situation and decided to make better use of the service and of his investment in wiring and he put on a milking machine and a water system, and a brooder, and ventilators in his barn and in his poultry house, and a refrigerator, and maybe a little water heater to provide hot water for washing his milking machine. Then his use of energy might go up to 200 kilowatt hours a month or say 2500 a year for easy figuring. The $50.00 fixed charges would then be only 2c a kilowatt hour.

Some companies collect these fixed charges in a separate service charge, other companies make sure of getting them by spreading them out over the rate for energy and setting up a rather high minimum bill which must be paid whether that much energy is used or not. It is useless to argue which way is the best for in both cases the charges are fair and they must be paid by the customer if rural service is to be furnished on a business basis rather than on a charity basis.

There is one other question, however, that always brings up a lot of argument. That is, how should the cost of supplying rural



Graph showing decline of electric rates and comparison with cost of living and price of farm products

service be divided among the customers who receive it? Power company men have worn out a lot of good pencils trying to figure that out and they have pretty generally agreed that the man who demands the most of a rural line and who can make the best use of it, should be expected and should be willing to pay a little more for it than the one who does not and perhaps cannot make much use of it.

That principle is applied in various ways. One rate, which has been very widely adopted throughout the country in the past few years, includes a service charge which varies with the size of the transformer which the customer needs.

That particular rate was developed by a representative committee of very intelligent farmers in cooperation with the power company that served them. They studied the subject honestly and carefully and they soon convinced themselves that if a rural rate were to be made attractive to the new customer who was just a beginner and whose use of energy would naturally be small, then the losses incurred in serving him would have to be made up by somebody else. That's simple, isn't it.

Suggest Service Charge

They wanted a rate that would encourage the development of rural lines, that would make electric service available to the rank and file of farmers everywhere and that would be so attractive that they would accept it. But, when they studied the cost of supplying service, they saw that small use at what they considered an attractive rate, would not meet the cost of the service. So they, themselves, suggested that whenever a customer added larger motors and appliances that required the next larger size of transtormer, he should pay $1.00 higher service charge. It was not designed as a fine for being a better customer and in actual practice it does not work out that way. Wherever good judgment is used in the selection of equipment, the savings that result from its use more than offset the higher service charge so that this customer still has a better bargain than the beginner or anybody else who makes very limited use of the service.

A 1½ KVA transformer installed for a farmer gives him the opportunity to use for any purpose electric power about equal to the power of one span of horses and that power is provided for his own use and nobody else's 24 hours a day, week in and week out. On the other hand, a 3 KVA transformer provides a farmer with the power of two spans of horses.

It often happens that the man with a 1½ KVA transformer may use as much electricity from it is as some other man uses from a 3 KVA transformer because the first man uses his for more jobs and a larger part of the time. However, they both pay the same rates for the current they use. The whole situation is a good deal as it would be if a man were to ask a neighbor to keep a team for his use,—a team that he could call for at any hour of the day or night. The neighbor would certainly charge him more for keeping four horses always ready at his beck and call than for keeping two horses. And the four horses would be worth more to him than the two horses if he had any four horse jobs to do.

So it is with transformers. It costs more to provide the big one and it's worth more to have it to provide for the bigger jobs of cooking and water heating and silo filling, and wood sawing, and grain grinding.

The Public Service Commission has not decided yet where the boundary line should be between the two companies, but whichever one of them builds out into the town of Castle Rock and serves Ed. Letz, I hope he and his neighbors will realize that electricity properly used on the farm is already the cheapest power that ever came there and that the generous use of it is ordinarily the most economical. In other words, the man who uses all of the electric energy it is practical for him to use has already brought his own rate down and is taking the most effective possible step to reduce the rates for his neighbors.

Better Chicks and
Better Hens with

ELECTRIC BROODERS

By J. C. SCOTT

WE are always learning something more about brooding chicks with electric brooders.

We first found that it was much easier, requiring less labor and attention, to brood with electricity. The fire hazard hardly exists with well-made brooders and proper wiring, and many poultrymen have found it the most economical method from the standpoint of fuel cost.

Better Pullets Produced

Now we are learning that modern electric brooders, properly constructed, furnishing plenty of heat and at the same time giving the chicks, while under the hover, sufficient fresh air with no harmful draughts, are producing a higher per cent of good pullets.

The electric hover more nearly approximates the mother hen than any other type of brooder, asserts Mr. F. L. McClane, Manager of the Alderwood Poultry Farms, Alderwood, Washington. He is able to put chicks into the colony houses at the age of eight weeks. They are so hardy, when brooded under electric hovers, that they suffer no setback. Mr. McClane broods 36,000 chicks a year and knows what he is talking about.

"By reason of cooler rooms where the chicks are brooded," says he, "we have comparatively little weakness in the chicks. Much of the coccidiosis and other diseases common to chicks are caused

Outside runway of wire netting to keep the baby chicks off disease infested ground.

These kerosene incubabators have been converted into electric units and are giving excellent service on the farm of Chas. F. Piepenbrink.

Electrically operated incubators in the farm basement of Jesse Snyder.

H. W. Fieting of near Lafayette, Indiana, taking tray of barred rock chicks from one of his electric incubators

by the general custom of keeping the brooding rooms too warm. The consequent overheating of chicks, which causes too rapid growth and other hothouse characteristics, results disastrously to many chicks when conditions are changed. Electric brooders eliminate these troubles to a very great extent. Four weeks is the critical age in the life of a chick, and if at this time it has plenty of room to spread out, in a clean dry place, a great many chick troubles are overcome."

This point is of much importance here because many electric brooders are rated for say 500 chick capacity, which really have that capacity only for the first few days. By the time the chicks are four weeks old, the hover is too small for comfort, health and best results in brooding. A brooder hover should have seven square inches per chick.

Heated Brooder Rooms Considered Injurious

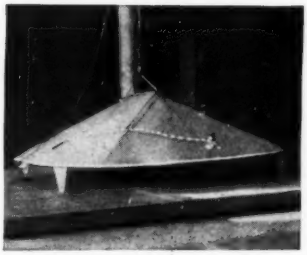
While a few poultrymen advocate supplemental heat in the brooder room where electric hovers are used, others, experienced with electric brooders, tell us that extra heat is not only unnecessary, but very undesirable, as long as the room temperature does not drop very much below freezing.

To develop hardy chicks, they must be given an opportunity to build up a body resistance to cold, which in turn helps to make them resistant to disease. This can best be accomplished by a cool room for the chicks to work in and a warm hover where they will go as soon as they begin to feel a little cold.

Feather Development Essential

To avoid heavy losses, chicks must have a good feather development on their backs before they can be roosted to put out in the colony houses. Heated brooder rooms are not conductive to proper feather growth.

Another thing in connection with electric brooding which is helping poultrymen of Western Washington to eliminate chick diseases and develop high producing pullets is the use of wire netting under the hovers. The wire netting, generally referred to as hardware cloth, is usually about ½-inch mesh.



Wire screen under electric brooder. In using the screen, care should be exercised for the first week to prevent too much cold air coming up under the screen.

The netting is tacked to frames made of 1 inch x 4 inch lumber, so that the netting, on which the chicks stand, is 4 inches off the floor. The frames are placed under the hovers and extend out from the hover at least two feet. Some poultrymen cover the entire brooder room floor with netting frames. This makes more sanitary quarters for baby chicks. Coccidiosis has been eliminated by keeping the chicks out of their droppings.

Produced Record Flocks

Mr. L. C. Boggs, Manager of the Breeding Farm of the Washington Co-operative Chick Association, near Lynden, Washington, broods 12,000 chicks a year with electric hovers on wire netting. He has produced flocks of hens with records of 250 eggs per hen per year or more.

The merit of Mr. Boggs' method of producing chicks is also partly reflected in the fact that one of the breeding farm hens laid 350 (24 to 26 oz. per dozen) eggs in 365 days during 1930.

Many other splendid records are being made by hens raised by electric methods.

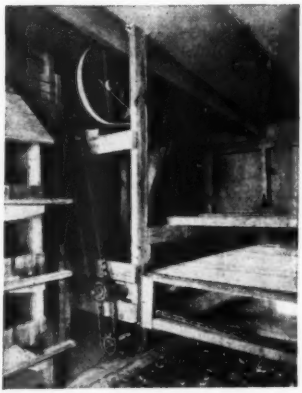
An Easy
METHOD OF CLEANING

By ROY WHITE
Farm Service Agent, Port Huron, Mich.

WHERE only a small number of hens are kept on a farm, the cleaning of the dropping boards beneath the roosts in the hen house, is a minor chore. But where the number exceeds a thousand, the job enters the class of a real task.

Out on Joe Miller's farm, near Port Huron, Michigan, a dropping board cleaner has been developed which cuts down the work to an almost negligible amount. The dropping board construction on the Miller farm is that recommended by the Michigan State College for their shed type of poultry houses, except that the boards are laid lengthwise instead of crosswise.

The cleaning device consists of an arrangement of two chains, one on either side of the dropping board, with pieces of angle iron cross connected to the chains to act



Above: A one-half H. P. motor is employed to drive the chains which carry the scrapers

Below: Dropping board in the Miller poultry house before cleaning

DROPPING BOARDS ▲ ▲ ▲

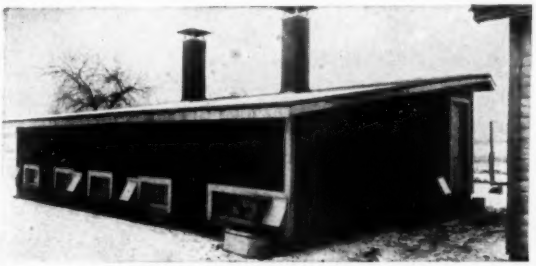
Right: The scrapers have made a good job of cleaning the dropping board

Below: Droppings are removed by means of a worm and screw conveyor

as scrapers. The chains are continuous, and run over sprocket wheels at each end of the house. The upper sections of the chains slide along the upper side of the dropping board, while the slack on the return is supported on strips below the dropping boards to relieve the strain on the driving members.

The chains are moved at a speed of approximately 40 feet a minute by a ½ h.p., 1,750 r.p.m. motor. The speed reduction is obtained by use of a pump jack with the drive pulley operating at 200 r.p.m. and the sprocket at 19 r.p.m. About 30 feet of dropping board is the limit for a ¼ h.p. motor.

The channel iron cross pieces scrape the droppings along the boards, and at the end the drop-



Where droppings are discharged by conveyor in Miller poultry house

pings fall into a galvanized iron trough holding a shaft with a worm and screw conveyor, which conveys the material through the side of the poultry house and permits it to fall into wheelbarrow or basket. By this means quick disposal of the droppings can be accomplished without inconvenience and breeding of flies, and the carrying of coccidiosis and other diseases, may be prevented.

A Convenient Arrangement

While this arrangement is about as convenient as can be conceived, it would not be absolutely necessary to have the screw conveyor as the droppings could fall directly into a wheelbarrow, cart, or boxes, placed beneath the end of the dropping boards.

The current cost has been found to be practically negligible, and as far as the work is concerned, all one has to do is to press the button to thoroughly clean the dropping boards. After each cleaning, the dropping boards are sprinkled with dehydrated lime, which keeps them in a thoroughly sanitary condition.

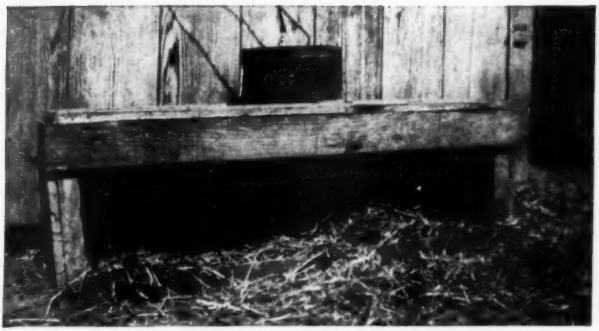
The illustrations herewith show the various features of the installation on the Miller farm.

A Hindus' Bathroom

Hindus at Calcutta, India, swarm to the Hoogly River to bathe. The bath is to wash their bodies as well as to observe a sacred rite. The water is a long way from being clean, but since it is sacred, what's a bit of sewage between Hindus?

Quite a difference, we'll say, between the bathroom of the Hindu and that of the modern American farmer who has the advantage of electric current. A continuous supply of running water, clean bath tub, and more important still, pure water for bathing, probably accounts for the low death rate among Americans as compared to that found among the Hindus in India.

Hindus at Calcutta, India, bathing in the Hoogly River. Quite a contrast between such a bathroom and that of the modern American farmer



Brooder for small pigs, heated electrically designed and built by Frank Catlin, Bartholomew County, Indiana

Cosy Homes

FOR WINTER PIGS

By T. E. HIENTON

"NECESSITY is the mother of invention" is an old adage that has been applied many times in recent years in the development of electric equipment for the farm. A good instance of this axiom in this particular field occurred on the farm of Fred Catlin located near Elizabethtown in Bartholomew County, Indiana.

Mr. Catlin, who is a progressive farmer, believes in giving his pigs a fair chance to grow. He has found that spring pigs farrowed early, that is during the winter, are profitable, and believes that it pays to use artificial heat for them. He has used a kerosene heater, but in January, 1930, he built an electric brooder for his little pigs.

Hover Construction

The hover is made of shiplap. It is 14 inches high, 14 inches deep and 4 feet long. It is heated by a 500-watt screw-type element similar to those used in the radiant or bathroom heaters used in residences. The heat is contained in an old bucket inverted on the top of the hover. To the bottom on the inside of the bucket, a receptacle for holding the heater was attached. It is Mr. Catlin's opinion that a strip heater of 200 or 250 watts capacity would be better suited for the purpose than the element which he used.

The hover was placed across one end of the hog house and was large enough to accommodate ten pigs. After the pigs had been placed in the brooder, they at once became accustomed to it and continued to sleep there even though the heater was turned off at the end of ten days when the weather became warmer. In zero weather in January by using this heater Mr. Catlin saved ten pigs from a litter of eleven.

He has found that it is a decided success in the savings of pigs and believes that the extra heat in the house was welcomed by the sows as his houses were not entirely tight. There was sufficient heat given off by the heater to raise the temperature in the house perceptibly during cold weather. The hover was closed on the side next the house and at both ends.

It was held in place by bars nailed to the house to prevent the sow from disturbing it.

"Electric heaters are much more convenient than kerosene heaters," says Mr. Catlin. "They can be changed from one house to another without the necessity of leveling them, and they are much more easily adjusted and controlled than any other type.

One season's experience with this pig brooder has induced the inventor to substitute a strip heater for the glowing element and to place it in the top of the hover itself rather than in a separate container as previously used. He thinks that it it will also be of greater benefit by using it in a tighter and better insulated house.

Feed Ground Wheat to Livestock

IT takes approximately 16 bushels of wheat to make a pig into a 200 pound hog, or about four times the per capita consumption of this crop. While it seems that little can be done to secure increased consumption in the form of bread and cereal, some reduction might be made in the surplus by fostering a greater appetite for bacon, steaks and chops. That it is relatively more profitable to market wheat on the hoof rather than sell direct has been pointed out by Prof. W. J. Loeffel of the Nebraska experiment station. Hogs, worth only $6.50, may return 80 cents a bushel for wheat, ground and fed together with tankage, he finds. At this station experiments have also shown that a mixture of three parts ground wheat and one part corn, when fed to fattening lambs, produced just as rapid and economical gains as shelled corn.

According to Prof. C. W. McCampbell of Kansas State College, wheat is more satisfactory for hogs than for any other class of livestock since they not only like it better, but hogs may be fed all they will eat without fear of digestive or other disturbance. In feeding beef cattle Professor McCampbell suggests the use of ground wheat, but for best results he recommends its greater use in the earlier part of the feeding period. Following this a mixture of ground wheat and corn should be fed alone.

From the Ohio experiment station, Prof. W. L. Robison reports that where ground wheat and corn were compared for feeding value for 62 pound pigs, those fed wheat were ready for market two weeks earlier and the ground wheat was worth 4.8 per cent more a pound than corn. In tests with 105-pound shotes there was no difference in rapidity of gains and the ground wheat was worth 3.2 per cent less a pound than corn. Where ground wheat was compared in feeding value to whole wheat it required 11.7 per cent less feed per unit of grain for pigs given the ground wheat and they were ready for market two weeks earlier. At this same station Prof. C. F. Monroe found that a ration made up of three parts each of wheat and oats and one part each of corn, bran and oilmeal proved just as good when fed to dairy cows as one in which corn was used in place of wheat.

Frost in Poultry House

Perhaps you will be interested to know that 100 laying hens will breathe out three to four gallons of water per day. Hens that are not laying will give off about half this amount.

This accounts for the frost that is found on the inside of the cold walls and windows, says W. C. Tully, poultryman at South Dakota State College. The moisture comes from the birds themselves and not through the wall, as some people believe. The only way to eliminate the frost entirely is to provide some ventilation to carry out some of the excess moisture and in addition insulate the wall in such a manner as to keep the inside wall from getting cold.

Secrets

"And why did you leave your last mistress?"

"I'll tell you when you tell me why your last maid left."

Ultraviolet Light
IN AGRICULTURE

By GEO. W. KABLE

ULTRAVIOLET is a comparative newcomer in the field of electric radiations. As is usual with newcomers, there has been considerable gossip and speculation about ultraviolet, and an effort to get the new family located in its proper social and economic place.

At the present time there are three uses to which ultraviolet radiations can be put on the farm with results which are quite definitely known. The first of these is for the treatment of chicks to prevent or to cure the disease known as rickets. The second is the treatment of chickens of any age to stimulate growth, improve vigor, and in the case of hens, to increase egg production. The third use is for combating certain maladies and improving the physical condition of human beings.

In addition to these practical uses there are a great many agricultural possibilities for ultraviolet which are being explored in research laboratories.

What Ultraviolet Is

Uutraviolet can hardly be termed light in the strict sense of the word, because most ultraviolet radiations are invisible. *Do not be deceived into thinking that so called "violet ray" lamps or ordinary electric lamps colored with violet dye are sources of ultroviolet light. The only thing that violet dye does to an electric lamp is to shut in all the other colors of light. It does not even increase the amount of violet light, but merely makes it stand out so it can be seen. The small amount of ultraviolet that is produced in the ordinary electric lamp is stopped by the glass bulb, for ordinary glass stops ultraviolet just as effectively as a dark shade shuts out the daylight.*

If you were to drop a pebble in a pool of water, waves would travel outward in circles. The length of the waves would be the distance from the top of one to the top of the next one. It is now commonly accepted that radio, heat, light, ultraviolet and Xrays are all waves of different lengths in the ether which fills all space. These waves in the ether are measured similarly to the waves in the water. Some of the radio waves are more than eighteen miles in length. On the other hand

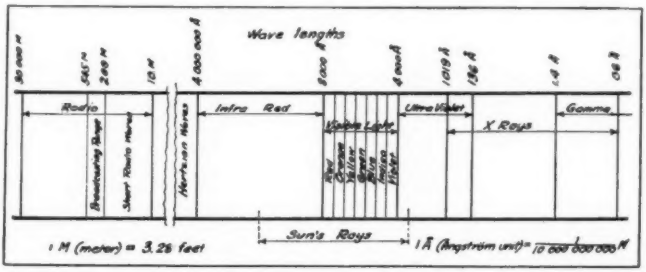


Diagram shows wave lengths of different rays and their relative positions in ether spectrum

it takes about two million waves of ultraviolet to make one inch. The accompanying diagram gives the relation of these different waves to each other.

Just a little longer than the ultraviolet are the waves of visible light. In the visible spectrum violet light is produced by the shortest waves, and red light by the longest waves. Just longer than the red rays of light and outside of our vision are the infra-red rays. The old carbon filament lamps, or any lamp producing heat, furnishes infra-red rays. The sun's rays which reach the earth include all of the visible light, some of the ultraviolet, and the shorter waves of heat, or infra-red rays. There is considerable overlapping of the different classes of rays in the spectrum. For instance, the shorter X-rays, known as hard X-rays, overlap the gamma rays emitted by radium, while the longer, or softer X-rays, have wavelengths similar to those of the shorter waves of ultraviolet. It is therefore not possible to draw a sharp line of demarcation between phenomena produced by soft X-rays and ultraviolet radiations.

Sunlight contains heat, all the visible light combined to make "white light," and the long wave end of the ultraviolet. In passing through the lower layers of the earth's atmosphere, the shorter rays of ultraviolet are absorbed and do not reach us. The more beneficial ultraviolet rays penetrate the atmosphere and have a marked effect on plant and animal life. They also cause the familiar sunburn, or erythema, if we expose our bare skin too freely to them.

Ultraviolet Lamps

There are now five types of ultraviolet lamps on the market.

The quartz mercury vapor arc has been most commonly used in the early investigations. It produces ultraviolet of much shorter wavelengths than those found in sunlight, and must therefore be used with discretion. Too long an exposure of such rays will cause serious burns and harmful effects. These short waves from the quartz mercury lamp can be very easily cut off, however, by passing them through ordinary window glass or other types of filters which effectively screen out the short waves.

The light from the carbon arc lamp is perhaps the nearest approach to that from the sun. It contains most of the longer ultraviolet radiations and some of the shorter ones. The quality of rays produced can be varied by using carbons impregnated with different minerals. Because of the flaming arc, these lamps are rather easily blown out by a breeze, and should be protected by screens to avoid scattering sparks.

The S-1 lamp, which looks very much like an ordinary 100 watt mazda lamp with a drop of mercury inside the bulb, is an excellent source of ultraviolet. The special glass bulb keeps in all but the beneficial rays. This lamp is rated at 450 watts, and must be used with a transformer in a special low voltage circuit. A sister to the S-1 lamp has recently made her appearance and is known as the S-2. It is similar to the S-1 lamp but is rated at only 175 watts, and gives about one-half as much ultraviolet.

The mercury vapor glow lamp is a mild source of ultraviolet. From ten to fifteen of these lamps are required to supply the equivalent amount of ultraviolet given by the S-1 lamp. These lamps must be used in specially wired circuits.

Practical Farm Uses

The ability of ultraviolet radiations to prevent and to cure rickets has been demonstrated by many investigators throughout the United States. Rickets is a disease caused by a lack of vitamin D. This vitamin can be supplied by ultraviolet irradiation directly, or through the irradiation of feeds supplied to the chicks, or by the feeding substances containing vitamin D, such as cod-liver oil. At the present time the cod-liver oil treatment is probably cheaper than the use of ultraviolet lamps. It possesses the disadvantage, how-

ever, of not being uniform in its power to prevent rickets, and of causing some digestive troubles, as well as requiring additional labor for mixing it with the feed. Dr. George H. Moughan, of Cornell University, has found that a five-minute daily irradiation with a quartz mercury vapor lamp at a distance of thirty inches is effective in the prevention of rickets, and that a seven-minute daily irradiation for four weeks resulted in complete cures. Dr. N. J. Russell reports that the effects of a fifteen-minute irradiation at thirty-six inches from the chick last for a week. A western Experiment Station has just completed tests which show that the use of the S-1 lamp is equally as effective in the prevention of rickets as the best grade of cod-liver oil. Daily exposures to direct sunlight (not through glass) will also provide the necessary ultraviolet.

Testing the effect of CX lamps on flower production in the greenhouses of H. W. Collins

Period of Irradiation

Where chicks are confined in a small space it is possible to irradiate them for a definite period each day. Where the chicks are not confined directly under the lamp it will be necessary to treat them for longer periods. It must also be borne in mind that the effect of the lamp is greater when it is close to the chicks. If the distance from the lamp to the chick is doubled the period of irradiation should be multiplied by four. A report from one of the lamp manufacturers states that two 25-watt glow lamps supported twenty-four inches above the floor brought through a brood of chicks with no indication of rickets. In addition to preventing rickets, the ultraviolet treatment of chicks seems to hasten their sexual maturity and to improve growth and vitality.

The use or ordinary lights to increase winter egg production has been a common practice for years. This increase in production is usually accompanied by higher mortality. A few years ago some experimental work was done at Oregon State College and the University of West Virginia indicating that the use of ultraviolet lamps in place of mazda lamps would result in an increase in production without the corresponding increase in mortality. As ultraviolet lamps which are safe and easy to use have come on the market, their use in the laying house has increased. Last winter a farm in Missouri obtained a large increase in egg production from pullets lighted with the S-1 lamp, over those lighted with the ordinary Mazda lamp. The Kentucky Agricultural Experiment Station reports that irradiation has resulted in an increase in egg production, increase in thickness of egg shells, increase of hatchability and an increase of the vitamin D potency of the yolks as compared with hens receiving no irradiation.

The CX lamp is much like the ordinary Mazda lamp, but of high efficiency and having an ultraviolet transmitting bulb. They are made in 60 watt, 300 watt and 500 watt sizes. From twenty to twenty-five 500 watt lamps are required to

provide as much ultraviolet as one S-1 lamp.

A great deal has been written about the effect of ultraviolet light on human beings. Many doctors are using these treatments for the prevention of colds and the general improvement of physical condition. Dr. D. F. Smiley, writing in the American Journal of Hygiene in March, 1929, states that: "A ten to sixteen-minute exposure of the naked body during the dark months of the year, to the rays of an ordinary mercury vapor lamp once a week at a distance of thirty inches, will in most instances reduce by at least forty per cent the incidence of colds in cold-susceptible individuals."

Investigators have found in recent years that not all ultraviolet radiations have the same effect. At the Basic Science Research Laboratory of the University of Cincinnati it has been discovered that while vitamin D is produced by some ultraviolet, long continued irradiation with these same waves, or shorter exposures to the shorter ultraviolet waves has a tendency to destroy vitamin D. Similarly, the treatment of milk with the longer waves will increase the vitamin D content; a middle range of waves has a germicidal action, destroying the bacteria as in the pasteurization process, and a still shorter group affect the physical properties of the milk and make it undesirable for food.

Possible Future Uses

Now that we have discussed the characteristics and practical farm uses of ultraviolet light, I am going to tell you of some of the newer experiments with it. *These are not recommended as being ready for farm application at present.* There is, of course, no law against any progressive farmer

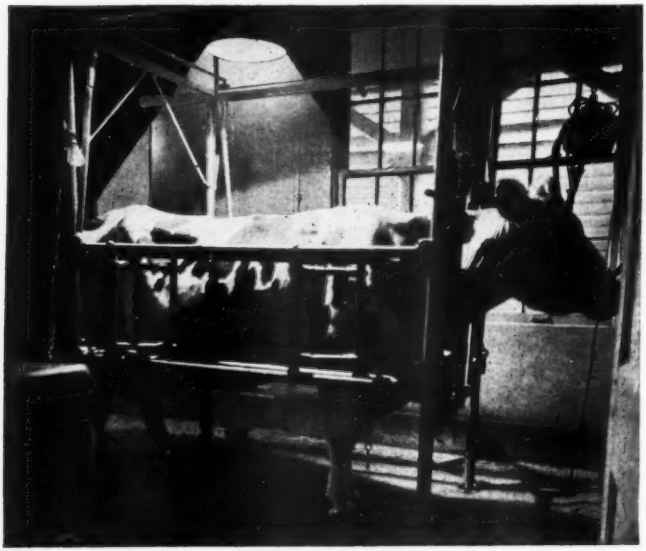


Photo courtesy "Certified Milk" and E. B. Hart, Ph.D.

Irradiating cows with ultra-violet light will not lead to a better utilization of lime or phosphorus, or to an enrichment of their milk in Vitamin D

with an inquisitive turn of mind conducting experiments for himself. Sometimes they are quite profitable.

Let's start with cows. Back in 1927 Professor Harry Steenbock is reported to have found that "when cows and goats were exposed to ultraviolet light, their milk had anti-rachitic properties which the milk of animals kept in the barn did not have." Professor Steenbock is the originator of the process for increasing the vitamin D content of foods by irradiation, and has done much of the pioneering work with ultraviolet at the University of Wisconsin. In a recent article Dr. E. B. Hart, an associate of Professor Steenbock, states that "irradiating cows with ultraviolet light will not lead to a better utilization of lime or phosphorus,or to an enrichment of their milk in vitamen D." Other investigators are working on the problem from different angles. Professor Sperti, of the University of Cincinnati, believes that the irradiation of cows with certain portions of the ultraviolet spectrum will increase the vitamin content of milk, while other radiations in the ultraviolet range would destroy it.

Sterilization of Milk

There is equally as much discussion of the sterilization of milk. It is reported that the ultraviolet process is being used in Germany. It has not had any practical use in this country. These investigators who have hopes for this process seem agreed that the proper wavelengths must be selected and the milk irradiated in very thin sheets, since ultraviolet rays penetrate only a short distance into organic compounds like milk.

Out at Washington State College an investigation is planned to determine the effect of irradiating cows, on milk production. It was stimulated by reports of the successful use of ultraviolet for that purpose in Japan.

Bee keepers are dependent for their honey crop on having large, healthy swarms of worker bees. One queen bee lays all of the eggs from which the workers in a hive hatch. Several years ago, Clifford Muth, a dealer in bee keepers' supplies, and Professor Isay Balinken, found that irradiating a fertilized queen bee for short periods on three succesive days with the larger rays of untraviolet had a marked effect upon the queen's egg laying ability, and the resulting worker bees seemed to be more contented, to live longer, and to be more tractable. It is estimated that one hundred of these irradiated queens have been placed in hives, and that ninety-five per cent of them raised better than ordinary broods. Reports from many bee keepers indicated an increase of from twenty to thirty per cent over the number of workers produced by non-irradiated queens, and the bees were easier to handle.

The results from irradiating plants with ultraviolet have generally been reported as detrimental to the plants. Too much ultraviolate will cause plants to die. On the other hand, a few investigators have reported some favorable results.

There is some evidence now that certain seedlings under the influence of limited bands of ultraviolet appear to be stimulated while they are small, after which there is no benefit from irradiation. An investigator for the Parke Davis Chemical Company states that seedlings of the drug plant, Digitalis, receiving some ultraviolet light, produced plants of greater potency than those not receiving this light. Still another investigator observes that pea seed treated for thirty-six hours gave much better germination than untreated seed.

Treating Fruit

Two uses of ultraviolet in connection with the fruit industry are under investigation. One of these involves the effect of ultraviolet on the coloring of fruit, and the other is the use of the irradiation method for the sterilization and preservation of fruit juices. It is suggested for instance that the preservation of orange juice through ultraviolet

(*Continued on page 39*)

ON THE AIR

Conducted by
JEROME J. HENRY

January Programs

THE American Farm Bureau Federation will present another of its monthly radio plays stressing an important agricultural message on Saturday, January 9, at 11:30 to 12:30 p.m., central standard time, in the National Farm and Home Hour.

On January 16, at the same time, the National Grange presents its program. This is followed one week later with a program of the Association of Land Grant Colleges and Universities interspersed with musical selections by the United States Army Band.

The Future Farmers of America broadcast is heard in the National Farm and Home Hour on the second Monday of each month, or Monday, January 11.

We all look forward to Irvin S. Cobb's radio appearances. He added a new activity to his long list of achievements as a humorist when he became a radio headliner, and has found that his radio audience enjoys his stories before the microphone quite as much as his books and magazine articles

• • •

Havana—New York—Chicago on Same Program

WITH a flick of a tiny lever an engineer in Havana set the waves humming with melody from the Carribean.

How was it done?

After 15 minutes of music by the Siboney orchestra, playing in the studios of station CMC in the Cuban capital, Walter Winchell signaled a lightning shift to Chicago where Wayne King and his musicians struck up a typically American tune for the radio audience.

Behind the scenes a score of engineers were working. They scrutinized dials, levers, and switches that control the current that makes the music glide over

The super-clowns of the air, in the persons of The Three Doctors, descend to the kitchens of a restaurant to demonstrate to their public that they really do get into a stew on Friday the 13th. Left to right: Doctors Pratt, Sherman, and Rudolph

thousands of miles. The problem was intensified through the linking of three points, New York, Havana, and Chicago, in the broadcast. Telephone wires hastened the program from Havana to New York. From New York engineers distributed the music to millions of listeners.

• • •

Wells Stars New Air Series

CARVETH Wells, explorer and author, has started a new series of broadcasts over an NBC network, heard every Sunday at 11 to 11:30 a. m., Eastern standard time. The feature is known as "Exploring America with Carveth Wells."

Every Sunday morning he discusses some fascinating and little known geographical and natural scene, and conducts a questions and answers period.

• • •

Collects "Tall Stories" for Book

WHEN Lowell Thomas casually dropped a "tall story" into one of his broadcasts he surely started something.

Now that the tall stories have come to be an established part of his talks and have assumed almost alarming proportions, the newspaperman, correspondent, and author has gathered them into a volume.

"The whoppers, grand, fantastic, improbable, impossible lies, are readily recognized as untrue, but we all tell them," Thomas informs his readers, "so why shouldn't we laugh our heads off when we hear them?" he argues.

The Revelers, popular male quartet and Frank Hawks, spend a day of rest at Shady Oak Farm in Texas. Above, left to right, are Tad Lucas, world's Champion girl trick rider; Lewis James, tenor; Frank Banta, accompanist; James Melton, tenor; Wilfred Glenn, bass. Seated on the floor is Captain Frank Hawks. On his left is Elliot Shaw, baritone

Charley Stookey, announcer who described the National Cornhusking contest for a nation-wide audience of followers. He is shown here with a short wave transmitter which enabled him to follow the huskers down the field as he gave the description

• • •

Significant Dates in Radio History

AMONG the significant dates in radio history are November 2, 1920, when KDKA, pioneer Pittsburgh station, broadcasted the

Holding the microphone is Frank E. Mullen, NBC director of agriculture, opening the broadcast from the National Corn-husking contest. At the right: William E. Drips, director of the contest. More than 60,000 people watched the event in the field on a farm owned by Clyde Wilhelm, Grundy Center, Iowa

Harding election returns; October 22, 1922, the first football broadcast—Princeton vs Chicago at Chicago; January 4, 1923, the first chain broadcast—lines connecting WEAF, New York, and WNAC, Boston.

Other historical radio dates are January 1, 1927—the first coast to coast hookup, carrying the Rose Bowl New Year's football game from California; February 1, 1929—first formal International broadcast—a band concert from Queen's Hall, London, following dedication of Bok Memorial at Lake Wales, Florida; December 25, 1930—International exchange of programs between United States, Germany, Holland, and England; and February 12, 1931, first world-wide broadcast from Vatican City.

• • •

Gets Onlookers to Help

FEELING the need for more emphatic and enthusiastic cheering than could be mustered by a male octet, Erno Rapee, famous musical director, during a recent program used a "sign" language to get a large studio audience to join.

The first time only a few got his idea. More joined on the second chorous, and all, on the finale.

"Thank you very much for the help," said Rapee, after the program, "but I hope you'll try to be more enthusiastic next time."

• • •

PHIL COOK, the man of many voices and comic character who comes to the homes of thousands of radio listeners daily, hammered at the gates of "big time" broadcasting for more than a year before he crashed the gates. He faked a sponsor to get an audition.

• • •

Studio Chatter

ONE of the oddest gifts ever received by a radio star is a pair of turtles with jewel studded backs sent to Edna Kellogg.

John P. Sousa wears the uniform of a lieutenant-commander in the U. S. Navy when he conducts his band in broadcasts.

Paul Whiteman uses the longest baton employed by radio conductors.

Ray Perkins, the Oldtopper, believes that "the best ten years of a woman's life is from 29 to 30."

Fritz Hummel at one performance rendered a trombone solo of "My Old Kentucky Home" with much feeling. When he had finished he noticed a man who seemed very touched by Fritz's playing, so he leaned over and inquired, "Are you a Kentuckian?"

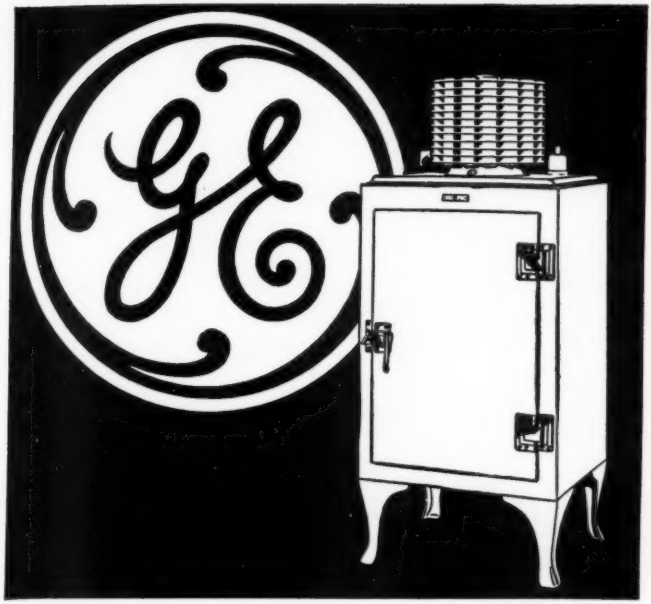
"No," the man sadly said, "I'm a musician."

Ted Weems, famous orchestra leader, remarks that he has discovered the necessity of the orange traffic lights. He says its there to give the Scotchman a chance to start his motor.

Lockett: "Do you know what I think of married life?"
Keyhoe—"Are you married?"
Lockett—"Yes."
Keyhoe—"Yes."

He Ought to Know

Son: "Was your father well-to-do?"
Father "No, son, he was hard to do."



REQUIRES NO ATTENTION

. . . NOT EVEN OILING

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Domestic, Apartment House and Commercial Refrigerators, Electric Water Coolers and Milk Coolers

ELECTRICAL HOUSEKEEPING

Conducted by
GAIL MEREDITH

Hot Muffins

LAST year Orpha Moe and Dorothy Becklow gave a muffin demonstration on the 4-H Club program at the Green County Fair. They came out onto the platform in their crisp little green and white dresses, looked at the group of us gathered there and Orpha began cheerily.

"Good afternoon everybody. We have had such fun making muffins during this club year that we have decided to show you how we do it."

She began at once selecting her materials as she needed them from a tray on the table before her.

"Break an egg in a dish. I take a knife and scrape out the white of egg to be sure that I do not waste any. Then I beat it with a fork, and add one cup of milk, beating it in some more. Next, I combine the dry ingredients. Two cups of flour, already sifted, two tablespoons of sugar, and three teaspoons of baking powder.

"You see we use standard measuring spoons," Orpha interrupted herself to hold the spoon up for us to see. "Then I add one-fourth of a teaspoon of salt. Without the salt my muffins would be very tasteless. I put in all of the dry ingredients at once. Our project leader taught us to be careful not to stir the muffins very much, and to stir the batter all one way. She said if we did not we would beat out all the air we had beaten in. Then, last of all, I stir in three and a half tablespoons of melted fat."

All the while Orpha was putting her muffins together, Dorothy stood at her elbow handing her everything she needed and deftly whisking out of sight all of the dishes she emptied.

After the muffins were mixed, Dorothy took the center of the stage.

"We call this batter Orpha has made the basic recipe. It is a plain muffin. I am going to show

Dorothy and Orpha mix the muffins

you how to make variations to it."

In the bottom of each of the muffin rings she put a tablespoonful of trimmings. She used raisins, dates, finely chopped meat, grated cheese, cocoanut, candied pineapple, nuts, blueberries and salmon. On top of these she put a tablespoon and a half of the muffin mixture and stirred the extras into the batter.

Then she put the muffin tin into the oven of the electric range that stood behind her, and she and Orpha went off the stage leaving the muffins to themselves.

Just twenty-five minutes later she came back and took them out, all brown and crusty and toothsome for us to admire. These are some of the recipes they gave us.

Blueberry Muffins

2 c. flour
3 tsp. baking powder
1 tsp. sugar
1 c. milk
4 tbsp. fat
2 eggs
½ tsp. salt

Add 3 tsp. sugar to 1 C. washed and drained berries. Sprinkle with flour and add to batter. Bake for 30 minutes at 425°.

Cornmeal Muffins

¾ c. cornmeal
1¼ c. flour
3 tsp. baking powder
2 tsp. sugar
½ tsp. salt
1 egg
1 c. milk
4 tbsp. melted shortening

Bran Muffins

¾ c. bran
1¼ c. graham flour
½ tsp. salt
4 tsp. baking powder
¾ c. milk
2 tsp. brown sugar
1 egg
4 tbsp. melted fat

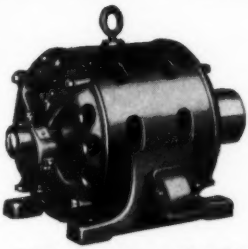
Bake twenty minutes at 425°.

• • •

Leisure

BUYING leisure may quite possibly be looked upon as one of the best investments for the chicken money. We can do it in countless ways. Sometimes it comes in with baker's bread, or a basket of clothes from the laundry. Always it follows in some measure, the use of machines instead of our own backs and arms for power jobs.

Perhaps you too have heard Miss Eloise Davison talk about investing in household machinery to bring us extra hours for something else besides the hard work of homemaking. Miss Davison used to be



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"They Keep A-Running"

Dependability is the big thing to look for in a farm motor. It is the big thing you will find in Century Type RS Single Phase Motors...That's why so many of them have been in daily use on farms for more than a score of years doing a lot of hard jobs more profitably and in less time than it takes to do them by hand.

Built in standard horse power ratings 1/8 to 40 horse power.

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40 U. S. and Canadian Stock Points and More Than 75 Outside Thereof

Century MOTORS

in charge of the study of household equipment at the state Agricultural College in Ames, Iowa. Now she is Home Economics Adviser for the National Electric Light Association.

Last winter I heard her talk to a group of women gathered at the University of Wisconsin during farmers' week.

"There are two sorts of jobs that we buy machines to do," she pointed out. "First, of course, are the ones that make a heavy physical demand on us, like washing and ironing and sweeping. But I think the second sort may be quite as important, that is, the things that make a nagging mental demand on us day after day."

She paused to let us search among our own housekeeping bugbears and lay out in a neat mental row those jobs we would like to get out of doing ourselves.

It is part of our jobs as homemakers," she went on, "to put processes in their right place, not to glorify them or whine over them, but to see that they are done as easily and as well as possible. I think one of the every day jobs that makes the heaviest mental demand on most women is dishwashing. When I hear someone get up and idealize dishwashing, I know right away that she has not washed as many dishes as I have. And that is one of the reasons why I expect dishwashers to be increasingly popular."

Then she went on to remind us that we are pretty apt to hang on to habits of drudgery long after there is a way out.

"You often hear women make a sort of proud moan about the amount of work they have to do. You hardly ever hear a woman talk about how quickly she finished a certain job, just as you never hear folks talk about the day they felt so good.

"We all have a certain amount of work to do, and we talk about it just a little smugly and not a little virtuously. But how many of you have ever thought that you have your leisure to do, too?" she asked us point blank.

"When we begin considering our leisure as a responsibility and an opportunity, we will begin to be actively interested in labor savers, because we will want to reduce the essential processes of our homes to the very lowest terms to give us more time for other things."

At this very same meeting Miss Lita Bane, now one of the editors of the Ladies Home Journal, had a word to say about some of the changes that are bringing more leisure into our homes.

"Do not worry about the processes that are going out of the home," she said. "Let them go. Their loss is not hurting the home any. They leave it a chance to do those things that nothing else can do. Foster human relationships; develop friendliness, encourage love, water the roots of personality."

We need a little leisure to achieve those things, don't we? We need time for thought, too, to reach up to the ideal Miss Ella Gardner of the Children's Bureau of the U. S. D. A. recently gave to a group of homemakers. But it is worth reaching for. This was the pattern she offered for a well rounded life:

"Love some folks very much. Believe some beautiful things. Live so as to have joy in your job."

• • •

Stop and Go

IF you like burned toast, you will not be particularly interested in the new automatic toasters for they will not let it burn. They have inside their shining chomium surfaces a cunning mechanism that keeps the bread between the glowing wires just long enough to toast it exactly to your order. It can be timed to a split second, so toast ceases to be a matter of luck. With one of these toasters at your elbow you police the toast traffic by working the stop and go signals.

They are quite simple affairs, just a lever and a button on one end of the toaster.

You plug in the cord as usual and there you are ready to go. But the current does not turn on just yet. When you want it, you drop a slice of bread in the top of the toaster and push the black lever down to the bottom of its slot.

When the lever is pushed down, it makes a contact that turns on the electricity. The instant you release it, it begins to climb steadily to the top. It moves fast or slow according to the way you set the button at the right and all the while it is going up it clicks away for all the world like the alarm clock inside the alligator in *Peter Pan*, the one that is forever chasing that bold bad pirate, Captain Hook, you remember.

Shuts Off Current

When the lever touches the top of the slot, it breaks the electric contact that cuts off the current. At the same time it releases a spring that shoots the slice of toast up like a jack in the box.

The first time I used one I felt much like an old negro laundress we had when we were living in South Carolina. She had recently lost her small savings in a bank failure, and her regret was the more bitter because the cashier came out and hung the "closed" sign in the front door just as she was crossing the street.

This iron has its own traffic signals

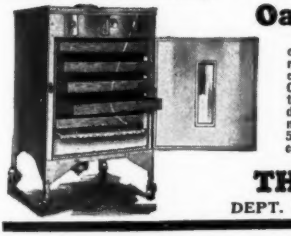
She loved to tell the tale, and she always ended dramatically,

"I'se heard plenty bout them banks bustin', Miss Gail. I'se done lived through more'n one panic, but dis yere is de fustes time I'se had

No fire hazard with ACORN Electric Brooders

A marvelous value. Write for catalog and prices.

Now a sound night's sleep. Now you can say goodbye to worry about fire, gassing the chicks and overheating. Acorn Electric Brooders, with fully enclosed heating element, adjustable automatic heat control, and insulated canopy assure desired temperature without fire hazard, and are as economical to operate as a coal or kerosene burning brooder. They come complete with pilot light, thermometer, flannel curtains, shock-proof rubber drop cord, etc. (Chain and hoist extra). Write for catalog.



Oakes LITTLE GIANT Electric Incubator

Here is the simplest operating incubator ever offered. Ready to set. To start, just "plug in" nearest outlet. You'll hatch bigger, healthier chicks and make more money. Steady heat. Correct moisture. All evenly distributed by electric motor and turbine fan blade. Yet no direct draft on eggs. Dependable heating element. All metal cabinet, double insulated with Cel-O-Tex. 540-egg capacity. Marvelous value. Send for catalog.

THE OAKES MFG. CO.

DEPT. 77 **TIPTON, IND.**

one to blow up and bust in my face!"

But I got used to it after the first slice or two. With this toaster you certainly cannot fail to see that the toast is done.

The button down in the right hand corner regulates the time of toasting. You set it way to the left if you like your toast brown and well done. It will take about a minute and a half for the lever to click its way slowly to the top. If you set it far to the right, the lever click-click-clicks its way up in half a minute, and you have delicate blonde toast, soft inside. With the button set half-way between, your bread will toast in just about a minute.

The automatic waffle iron is the twin of the toaster and it has its own accomplishments. It does not shoot the waffle across to your plate when it is done, but it flashes a signal light that tells you when the iron is ready for the batter and when the waffle is ready for you. The first waffle is as good as the last with this iron. You do not have to sniff curiously around the edges while it is baking, nor peek at it now and then to judge its progress. You watch the lights.

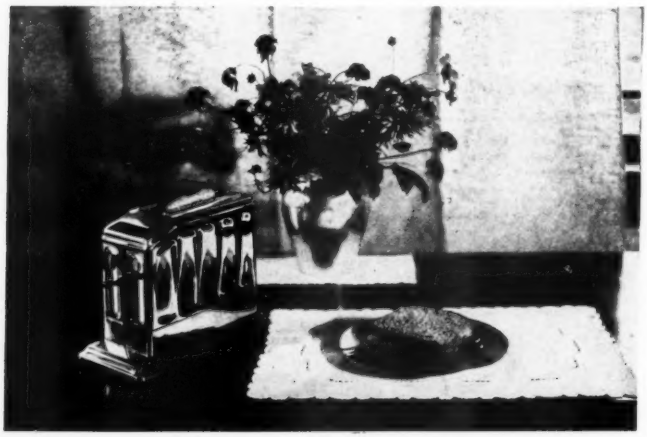
The automatic heat control keeps the temperature even so that the iron is always ready for the next waffle. It will not get too hot; it will not cool down. With the heat just right, all your waffles will bake alike. They will be light and crispy, golden brown.

A friend of mine used her waffle iron for cinnamon toast when we were there for tea a few Sundays ago. She had cut the bread quite thin, buttered it, and sprinkled half of the slices with a mixture of cinnamon and sugar. She put the plain half on top the cinnamon and laid the sandwiches on the hot waffle iron. The signal lights are not set to tell you when toast is done in the waffle iron, but watchful supervision brought it out triumphantly. She toasted a great pile of corrugated sandwiches and served them piping hot with our salad.

Not the Dog

A man was in the habit of letting his dog sit by his side at meals. One evening when he was out at dinner a woman next to him, wishing to attract his attention, gently touched his sleeve.

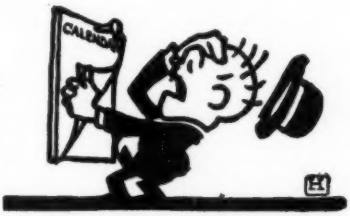
To the consternation of all present, he gave her a bone from his plate and said, "Oh, get away. Take this out on the mat and eat it."



The toast bobs up when it is done

Yes! Inventory Time Again!

Right now at the start of the year is the time to check up and see just how electric servants can be used to make yours a more profitable and comfortable farm. Below are listed the appliances which are being used to advantage by other farmers.



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TEAR OFF HERE

ELECTRICITY ON THE FARM, 24 W. 40th St., New York

Without cost to me, please have manufacturers send complete information on the following Electrically Operated Equipment which I am thinking of buying:

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My name is.....

Address .....

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I get electricity from..... .....

1-32

Electric Refrigeration in the Farm Home

By Pearl M. Reifsteck

I WOULD like to give some of the ways that I have correlated the uses of my range and refrigerator. Much time and labor have been saved by cooking quantities of meat, vegetables, etc., in the electric oven, putting them into the refrigerator and using when needed in cold dishes, patties, stews, hashes, etc.

Mrs. Reifsteck's refrigerator shares with the cream separator a little room off the kitchen

When I want to go out to lunch but must prepare a meal for my husband and anyone else who happens to be present, meat, potatoes, etc., are put in the oven, dessert and salad in the refrigerator, and I go on my way knowing that the ones at home are not being neglected.

Our box is a seven cubic foot size and amply suits our needs as well as being good to look at. The ideal is the porcelain enameled both inside and out, as it is as easily cleaned as a dish. However, the cheaper ones are very nice. One should be sure to get a refrigerator large enough as tests show that the difference between the amount of current consumed by a small and a large box is very slight. There are times when a large size may even use less energy than a small one, but that is usually due to the fact that the small one is poorly insulated or the doors do not fit well. Any difference in price is made up by the satisfaction of having something suitable.

We have a desirable place for ours, as it is in a room just off the kitchen that is not heated in winter, and still is conveniently placed. Many women prefer theirs in the kitchen and even though the refrigerator is kept in a warm room all the time it will be noticeable that it consumes less energy in winter than in summer. We have always used our box all the time. There is a growing tendency on the part of the owner to use his refrigerator the year round, because there is a distinct advantage in keeping foods at uniform temperature always.

Our Operating Costs

The average monthly consumption of our refrigerator for year before last was 36 k.w.h., value $2.40, July was the high month and it used 71 k.w.h. of electrical energy at a cost of $4.74, so you can see that the cost of operation compares favorably with the cost of ice.

Hot foods should not be put into it unless absolutely necessary. In our case a test made showed that the number of times the doors were opened seemed to have no effect on the current used.

That less energy is used by a refrigerator in a cool room than in a warm one is indicated by tests made on our line during the winter on several boxes of the same size and make, some located in warm and others in cool rooms.

Some Test Facts

Tests also showed that the inside box temperature varied directly with the room temperature.

In one instance the difference in energy used in summer time by two boxes of the same make was no doubt due to the difference in the users. Some are more careful than others, keep liquids covered, etc., and freeze a small amount of desserts and ice.

We are often asked if our re-

frigerator gives much trouble. We have used it for about four and one half years and it has required no servicing.

Recently I heard a woman speaker make the statement that the one thing that women required of an electric refrigerator was that it be attractive and beautiful so that they could show it off and incite the envy of their friends and that the mechanism, etc., meant nothing to them. Is that so? I doubt it. At least I could not let it go unchallenged.

Enjoy Beauty of Design

Woman should want a good looking refrigerator but also an efficient one and the manufacturer who combines beauty and utility is wise. We cannot get away from the fact that beauty adds greatly to our enjoyment in using equipment.

One very important factor to be considered in selecting a refrigerator is good insulation. This determines to a certain extent the energy consumption of the box. The amount of current used by a poorly insulated foot box at Larned, Kansas illustrates this. Before it was insulated with one inch of fibre insulation its energy consumption was 29% above the yearly average for similar boxes and its summer average 55.5% above.

Other points to be remembered are that the doors should be properly lined, well-fitting, and that the manufacturer be reliable.

If the cost of ice is added to the labor of the farmer and his family in getting the ice, caring for the ice box, etc., the electrical refrigerator is more economical than older means of preserving food, disregarding entirely the inconvenience of using the latter.

To some people the fact that parts may wear out and the refrigerator may at some time need skilled attention is a disadvantage. However, the majority of dealers realize this and have a service man to look after such matters.

At the present time the greatest objection to an electric refrigerator seems to be the initial cost. There is hope ahead because the price is gradually being reduced.

The farm is being made the best of all places to live. Electricity is a big factor in attaining that goal and the electric refrigerator one of the pieces of equipment that make country life easier and more delightful.

Preventing Calf Vices

Where two or more calves are being fed skim milk and are not confined in stanchions during the feeding period they often develop the habit of sucking each other's ears or bellies. Persistent sucking of heifers may later result in congested quarters and permanent injury. Not only should the calves be confined to stanchions while having their milk, but also until their faces are dry or until they have had an opportunity to eat some ground feed. Special steel stanchions are built for calf pens which are economical to install and easy to keep clean.

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Get more milk, cleaner milk and bigger milk checks by regular clipping—save one man's work and do a better clipping job in half the time . . . the

STEWART ELECTRIC Clipmaster

Clips cows, horses, dogs, mules

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Satisfaction or Your Money Back

$19.50 with built-on aluminum handle. Universal motor for 110-120 volt. Strap handle model $18.50

Free Catalog describes world's largest line of power and hand clippers and shearing machines

Questions and Answers

Conducted by H. J. GALLAGHER
Agricultural Engineering Dept.
Michigan State College

Question: *Can the direction of a split phase motor be changed?*

Answer: Yes, in the split phase motor there are two different windings, the starting winding and the running winding. Interchange either the running winding connections or the starting winding connections and the direction of rotation will be reversed.

On most split phase motors this can be done by interchanging the two wires from the motor on the posts to which the service wires are attached. Interchanging the service wires has no effect on the direction of rotation.

The direction of rotation of the repulsion induction motor is changed by changing the position of the brushes on the commutator. This is done by loosening the screw which keeps the brush holder in place and moving the brushes to a position indicated on the motor frame. It is important that the brush holder be clamped in the right place to establish the correct relation between the windings of the stationary field and the armature. Excessive sparking and lack of power result when the brushes are out of position.

Question: *I would like to know approximately how much electric current it would take to warm 50 gallons of water from a temperature of 40° F. to 70° F. in a light steel barrel, air temperature of 50° F. outside of barrel.*

Geo. F. McCracken, Rockland, Mich.

Answer: Fifty gallons of water equals 416.5 pounds. One B.T.U. (British Thermal Unit) of heat raises one pound of water 1° F. To raise 416.5 pounds of water 30° F. requires 12,495 B.T.U. Heat loss by radiation and conduction on 22 square feet of steel tank between 60-70° F. would be 242 B.T.U. per hour, making a total of 12,737 B.T.U. per hour. One kilowatt hour equals 3,412 B.T.U. The amount of electric energy required would be 3.733 K.W.H. This would require a heating element of 3,733 watts operating one hour or an element of 7,466 watts operating one-half hour. If the water from the tank was used intermittently in small quantities at a time, heat from the room would help keep the water in the tank at 60° F. which would materially reduce the amount of current required. If water at 70° F. was required in quantities at a time, not much advantage would be derived from the temperature of the room except to reduce heat losses up to 60° F. A supplementary storage tank of 50 or 100 gallons could be used in which the water could be brought to room temperature before entering the heating tank. In this case the amount of electric energy required to heat 50 gallons of water per hour from 60° to 70° F. would be 1.391 K.W.H.

Question: *Is stranded wire better than solid wire for carrying electricity?*

Answer: As far as the carrying capacity of the wires is concerned solid conductors have the same capacity as stranded wires of the same cross section area. Advantages of stranded wire are greater flexibility and less danger of crystallization. Flexibility is highly desirable in extension cords to fixtures, appliances and equipment. Stationary circuits requiring less than No. 6 wires are usually of solid copper, while circuits requiring No. 6 wire or larger should be stranded. Stranded wire is always preferable in cables so they will not crystallize and break due to bending action.

Ultra-Violet Light

(*Continued from page* 25)

irradiation will result in keeping all of the flavor and good qualities of the fresh juice.

Which of these lamps should be used on chickens and in the home? The S-1 and S-2 lamps, and some of the carbon arcs are being made in several floor and table designs for home use. The desirable length of time to use the lamp should be about one-fourth of the time required to produce the least red coloring (sunburn) of the untanned skin. No damage will be done in determining this point if instructions with the lamps are followed.

In the laying house the S-1 or S-2 lamps are perhaps most satisfactory. At distances of six feet from the floor one hour's irradiation per day will be adequate. If it is desired to use CX lamps on the 110 volt lighting circuit, the 500 watt size should be used about three hours per day for one hundred hens. In using the 300 watt CX lamps, they should be hung three to four feet from the hens to get the same results. Sixty watt CX lamps may be used effectively in special reflectors pointing upward at the hen's legs from under the feed hoppers. The legs and heads of fowls are the untraviolet absorbing parts. The feathered parts are not greatly affected.

There is little danger from overexposing chickens and their eyes are apparently not injured by ultraviolet. The best reflectors for ultra-violet are either chromium plated or of aluminum. Ordinary white reflectors are not satisfactory.

New "Vacuum Cleaner" Removes Cattle Pest

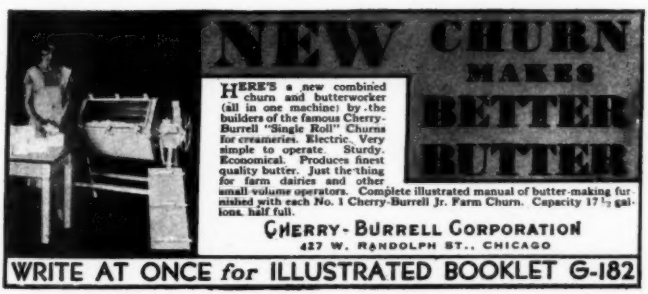
The housewife with her motorized sweeper has nothing on the farmer of the future, for the United States Department of Agriculture has developed a "vacuum cleaner" to extract ox warbles from the cow's back.

Doctors Imes, Boyd and their associates stationed at Galesburg, Ill., to study the problem of ox-warble infestation of cattle, built this "vacuum cleaner" on an automobile trailer. It has four to six lines of suction hose and nozzles. When in operation, a nozzle is placed over an ox-warble grub on the animal's back and the grub is drawn out through the opening in the skin.

The machine will remove all ox warbles, but because af the tenacity of the older grubs two or three attempts are frequently necessary to dislodge them. Doctor Imes and his co-workers hope to perfect the nozzles sufficiently to get a grub with every suction. It is hoped that this machine will be practical for country-wide campaigns against the ox warble in regions where it is easy to corral all cattle in large herds and send them through chutes to be "degrubbed."

Heretofore the most satisfactory

(*Continued on page* 41)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Under The CHESTNUT TREE

Rhymes With "Rejoice"

"The husband ought to have a voice in the furnishing of the home," says a woman writer.
Oh—but he does—the invoice.

"My dear," called a wife to her husband in the next room, "what are you opening that can with?"
"Why," he said, "with a can-opener. What did you think I was doing with it?"
"Well," replied the wife, "I thought from your remarks that you were opening it with a prayer."

A Sure Way

"I hope you didn't ask for a second piece of cake at the party," said mother.
"No, I didn't," said little Betty. "I just asked Mrs. Brown for the recipe so my mother could make some more like it—and she gave me another piece without my asking for it!"

Political Note

Senator: "If you marry me, dear, I'll make you the happiest woman in the world."
His Intended: "Are you sure this isn't a campaign promise?"

Pie a la Cook Book

Husband: "Goodness sake, I smell something burning"
Wife: "Yes, it's the pie, but according to the cook book, I can't take it out for another twelve minutes."

The Critic's Comment

This was one of the favorite stories of the late Joseph Jefferson.
Back in the '80s of the last century, a barnstorming theatrical company arrived in a small Kansas town and gave an alleged performance of "Uncle Tom's Cabin."
The manager of the company insisted, in return for a number of passes, that the editor of the local paper should give unstinted praise of the performance.
Accordingly, the next day the following brief mention appeared in the "dramatic column":
"Last night at the Opera House, the ——— Company played 'Uncle Tom's Cabin.' The dogs did well, but they had poor support.

Tramp—"Kin I cut your grass for a meal, mum?"
Lady of the House—"Yes my poor man. But you needn't bother cutting it; you may eat it right off the ground."

Self-Protection

"What's the idea of all the luggage? Are you and the wife going on a long trip?"
"No, my church is holding a rummage sale which my wife is going to attend. I'm taking all my things over to the office."

Safe

Tommy was meandering homeward much later than his usual supper time. A friend of the family who happened to meet him said:
"Why, Tommy, aren't you likely to be late for supper?"
"Nope," replied Tommy, "I've got the meat."

"Oh, we had the loveliest arrangement at our church society last week. Every woman contributed $5, which she had earned herself by hard work."
"How did you get yours?"
"From my husband."
"I wouldn't call that hard work."
"You don't know my husband."

Hens' Secretary

Old Giles had worked nearly 40 years as gardener and odd-job man, and was apparently contented, until one day his employer added the care of the poultry to the old fellow's duties.
"I want you to write on each egg the date and the name of the hen that laid it," said the employer.
The following day Giles approached his employer.
"I'm leaving," he said.
"Leaving! Why?" asked the other.
"Well," came the answer, "I've done nearly everything on this estate for the last 40 years, but I ain't going to be secretary to your blooming hens."

Removing Cattle Pest

(*Continued from page 39*)

method of removing the grubs was to extract them through the openings in the animal's back one at a time with forceps, preferably of the alligator type. This is a slow and expensive method. Experimenters in Europe found that about all of the grubs could be destroyed by inserting a small medicated stick in the grub opening.

The department's ex-warble studies revealed that young cattle are more heavily infested by this parasite than are older animals, and also that females are more often parasitized than bulls. The heifer is most attractive to this pest, while the old bull is the least attractive subject.

The Way It's Put

One of those big strong men walked into a ladies' shop and said, "I want to get a set of ladies' furs. That brown set in the window will do."

To which the shopman said, "Oh, you mean skunk." And the shopman is still in the hospital.

"These shoes don't fit me. I want broad shoes."

"Broad shoes are not worn this year. They are all narrow."

"But I have last year's feet."

Young Webster

Various words were being defined by the class. Finally the teacher turned to Johnny and asked, "What is velocity?"

"Velocity is what a fellow lets go of a bee with," promptly replied the youngster.

"I can't give you anything but love, baby," sang father, as he rocked the infant back to sleep.

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Make money painting for neighbors.
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EVERY feature of the Hinman Groomer has been developed from the standpoint of the modern dairyman. Light in weight, portable and durable, its powerful suction gives speedy, thorough, sanitary grooming. Operates from any 110 volt light socket; runs 1,000 hours without lubricating. Send today for illustrated folder and free demonstration offer.

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Electric Milk House Equipment
Milk Coolers for cans . . . and for bottled milk . . . Dairy Water Heaters . . . Dairy Utensil Sterilizers.
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WATER SYSTEMS
Provide Running Water at Low Cost
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THE FT. WAYNE ENGINEERING & MANUFACTURING CO.
1722 N. Harrison St.
FORT WAYNE, IND.

Electricity in Rural Alabama

More and more the advantages from the use of electricity are being experienced in the rural communities of Alabama. Concrete results have been noted in Dixons Mills, Alabama, according to A. W. Jones, Vocational Agricultural teacher there.

"Out of the great number of problems that a poultry keeper has, one of the most important is maintaining satisfactory egg production during the winter months," states Mr. Jones. "One local poultry-woman, Mrs. J. K. Pearson, had gratifying success last winter in working out this problem through the use of electric lights to increase her hens' working hours."

Mrs. Pearson had 300 laying hens, and, as the winter days grew shorter, the egg production decreased, due to the longer hours of darkness when no food was consumed. Two 50-watt lights were installed in the 70 foot laying house. The lights were turned on, by a switch located in the kitchen, to give the hens about two and one-half hours extra light each morning. The egg production immediately increased three dozen, or 18% per day, and at that time eggs were selling for 45c per dozen, making a gross increase of $1.35 per day, or $40.50 per month. The electricity and extra food amounted to about $10.00 per month, leaving a net return of $30.50 as the result of lights. This practice was continued with the same success until natural daylight had increased sufficiently to make the further use of artificial lights unnecessary.

Farmers and poultrymen throughout the State are experiencing similar results from the use of electric lights to stimulate egg production during the short days of fall, winter and spring.

Other results were noted last year in the Dixons Mills community where Mr. Jones eliminated the problem of supplying water for over two hundred high school children by installing a ½ HP automatic electric water supply system. "For low cost of production, convenience and efficiency in supplying sufficient volume of water," states Mr. Jones, "this unit meets the need as completely as could be asked of any fresh water system."

In addition to pumping water, the motor is used to operate a small re-saw, trimmer, and tool grinder, which are valuable aids to the work done in the school shop. The next installation in the shop, Mr. Jones says, will be a small wood-turning lathe.

S. R. Gibbons.

• • •

Reduces Hard Labor

We have water piped to all the buildings, thus saving much hard labor and time.

As usually the water question is up to the wife to carry to the hens, of which there often is close to a thousand or more, I honestly believe a man would save many a doctor's bill, also operation bill, if they would put in a water system instead of leaving the women break down their health, as many are doing.

Mrs. E. L. Dunning,
Brush Prairie, Wash.

CLASSIFIED ADVERTISING

The LYON ELECTRIC COMPANY manufacture electric poultry equipment exclusively. Long, practical experience in the highly developed California rural electric field enables us to furnish quality devices at reasonable prices. The LYON line includes: Brooders—Incubators — Egg Testers — Burglar, Temperature and Power-off Alarms — Heating Elements—Thermostatic Supplies—Time Switches—Wiring Supplies. Write for catalog today. LYON ELECTRIC COMPANY, 2075 Moore Street, San Diego, California.

New 8" Swing Back Geared Screw Cutting Precision LATHE for the farm shop. $100 and up on EASY TERMS. Supplied with Countershaft or Motor Drive. Write for Circular No. 8. SOUTH BEND LATHE WORKS, 569 Madison Street, South Bend, Indiana.

This winter will be a busy time for chicken thieves everywhere and it will be too late to do anything after all your nice poultry is gone. Let MIDNIGHT ALARM watch your premises while you sleep. Write for circular "F" today. MIDNIGHT ALARM SYSTEM, 2327 Chickasaw, Cincinnati, Ohio.

COVER TITLE CONTEST

November Winners

First Prize - $25.00

"Keen is the axe by electricity ground . . . Keen is the joy when Thanksgiving rolls 'round."

Mrs. C. Hjermstad,
R. 1, New Lisbon, Wis.

The following titles have been selected as winners of the $5.00 cash prizes:

●

"As the turkey gobbles and struts around . . . By electric-power the axe is ground."

Mrs. J. Herbert Deacon,
R. 1, Columbus, N. J.

●

"A turkey to slay for Thanksgiving Day . . . So dad sharpens his axe the electrical way."

Helen Spitler, R. 8, Decatur, Ill.

●

"While electricity Daddy's axe doth grind . . . Thanksgiving turkey is on Johnnie's mind."

Thressa Metzger,
R. 1, Mulberry, Ind.

●

"Woe to this turkey on Thanksgiving Day . . . Dad's sharpening his axe the electrical way."

Miss Florence Brinkmeyer,
R. 3, Newton, Kan.

●

"An electric ground axe, an eager boy . . . A fat bird for Thanksgiving joy."

Leo H. Keil, R. 3, Aurora, Ore.

RULES for January Contest

For the best title to this month's front cover illustration, a cash prize of $25.00 will be awarded.

In addition, we will pay $5.00 for each of five titles given honorable mention.

In case of a tie, each winning contestant will receive the full cash prize to which he or she is entitled.

The winners will be announced in the March issue.

Only the farmers or members of the farm family, to whom this magazine was sent, are eligible.

Only one title may be submitted.

Use the form below or write your answers on a plain sheet of paper in similar form.

Contestants must answer question (A).

Write plainly and send your suggestion to the Title Editor, ELECTRICITY ON THE FARM, 24 W. 40th St., New York, before February 1, 1932.

My title for the January Front Cover picture of ELECTRICITY ON THE FARM is

.....

.....

.....

.....

(A) In what town or city do you buy Electrical Appliances?

.....

How far is it?.....miles.

My name is..... R. F. D.....

Post Office..... County..... State.....

ARE YOU MAKING A PROFITABLE USE OF ELECTRIC LIGHTS?

WITH electricity available on your farm, there are countless ways you can use electric lights to increase convenience and efficiency.

When electricity lights your way in the farmyard, you have an extra hand to work with—the hand that now holds the lantern. You lessen the danger of stumbling and falling—you can carry two pails of milk instead of one.

In the barn, proper electric wiring and lighting banish fire hazards, make milking after sundown easy, and enable you to repair machinery and do odd jobs at night.

In the house, proper lighting prevents eyestrain and adds to the attractiveness of your home.

Adequate lighting pays a profit—it's worth many times its cost in time saved, convenience, and safety. Make a survey of your needs now!

NORTHERN INDIANA PUBLIC SERVICE COMPANY

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